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EXAMINER

FINEMAN, LEE A

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 08/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/899,481

Applicant(s)

LIU ET AL.

Examiner

Lee Fineman

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3,4 and 6-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3-4 and 6-21 is/are allowed.
- 6) ☒ Claim(s) 22 and 23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s): _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to an amendment filed 12 May 2003 in paper number 10 in which claims 3-4, 6, 9 and 15 were amended, claims 21-23 were added and claims 1 and 2 were cancelled. Claims 3-4 and 6-23 are pending.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claim 22 is rejected under 35 U.S.C. 102(e) as being anticipated by Cao, U.S. Patent No. 6,236,506 B1.

Regarding claim 22, Cao discloses a four-port loop optical circulator (figs. 7a and 7b) comprising a first (303, C), a second (302, D), a third (303, A), and a fourth (304, B) optical ports for receiving an optical beam therein; and a plurality of optical components (figs. 7a and 7b) for guiding a beam received from said first port to project from said second port, for guiding a beam received from said second port to project from said third port, for guiding a beam received from said third port to project from said fourth port, and for guiding a beam received from said fourth port to project from said first port (fig. 8, steps 800-809), a walk-off crystal for generating a vertical optical path displacement for a vertical polarized optical beam and for passing a horizontally polarized optical beam therethrough maintaining a same optical path

(309), a polarization beam splitter (PBS) (702) coupled to the walk-off crystal and configured to reflect a beam received at a lower optical path (813, from step 806 to 807, in so far as there is a higher path from the fourth port 304, B at 812) from said fourth port along a vertical direction (fig. 8, step 803) for generating a predefined vertical displacement, and a right angle prism (701) disposed at a predefined vertical displacement from the PBS (fig. 7a) and configured to reflect an optical beam received from the PBS in a substantially horizontal direction along an upper optical path to the walk-off crystal (812, from step 806 to step 807, in so far as there is a lower path at 813).

Regarding claim 23, Cao further discloses a first half wave plate (316 or 317, two times through a quarter wave plate) for changing the state of polarization (SOP) of light from a first SOP to a second SOP to allow light to be reflected by the PBS (fig 8, steps 803-807); and a second half wave plate (310) for changing the SOP back to the first SOP after reflection by the PBS (fig. 8, step 807 to step 808).

Allowable Subject Matter

2. Claims 3-4 and 6-21 are allowed.
3. Claims 3-4 and 6-14 are allowable over the prior art for at least the reason that the prior art fails to teach and/or suggest “a vertical displacement means for shifting an optical path along a vertical direction with a predefined vertical displacement for an optical beam transmitted with a particular polarization” in combination with “a first birefringent crystal disposed on a left-hand side of said walk-off crystal for generating a first ordinary beam and a first extra-ordinary beam

and a second birefringent crystal disposed on a right-hand side of said walk-off crystal for generating a second ordinary beam and a second extra-ordinary beam” or “a first polarization rotation means disposed on a left-hand side of said walk-off crystal for generating a first state of polarization for a first ordinary beam and a first extra-ordinary beam to project to said walk-off crystal and a second polarization rotation means disposed on a right-hand side of said walk-off crystal for generating a second SOP for a second ordinary beam and a second extra-ordinary beam to project to said walk-off crystal” as set forth in the claimed combination.

Ducellier et al., U.S. Patent Application Publication Number, US 2002/0024730 A1, disclose a four-port loop optical circulator (fig. 14) comprising a walk-off crystal for generating a vertical optical path displacement for a vertical polarized optical beam and for passing a horizontally polarized optical beam therethrough maintaining a same optical path (329b) and a vertical displacement means (326) for shifting an optical path along a vertical direction with a predefined vertical displacement for an optical beam transmitted with a particular polarization (page 5, section [0064], lines 19-22) but does not have a first birefringent crystal disposed on a left-hand side of said walk-off crystal for generating a first ordinary beam and a first extra-ordinary beam and a second birefringent crystal disposed on a right-hand side of said walk-off crystal for generating a second ordinary beam and a second extra-ordinary beam or a first polarization rotation means disposed on a left-hand side of said walk-off crystal for generating a first state of polarization for a first ordinary beam and a first extra-ordinary beam to project to said walk-off crystal and a second polarization rotation means disposed on a right-hand side of said walk-off crystal for generating a second SOP for a second ordinary beam and a second extra-ordinary beam to project to said walk-off crystal as claimed.

4. Claims 15-21 are allowable over the prior art for at least the reason that the prior art fails to teach and/or suggest “a vertical displacement means for shifting an optical path along a vertical direction with a predefined vertical displacement for an optical beam transmitted with a particular polarization, and wherein said vertical displacement means is adapted to transmit or receive said vertical polarized optical beam from said walk-off crystal, including vertically displacing the beam received from said fourth port and not vertically displacing the beam received from said third port or first port” as set forth in the claimed combination.

Ducellier et al. disclose a four-port loop optical circulator (fig. 14) as set forth above including a vertical displacement means (326) and including vertically displacing the beam received from said fourth port, but also including vertically displaces the beam received from said third port or first port which is not as claimed.

Cao discloses a four-port loop optical circulator (figs. 7a and 7b) as set forth above including a vertical displacement means (701, 702) and including vertically displacing the beam received from said fourth port, but also including vertically displaces the beam received from said third port or first port which is not as claimed.

Response to Arguments

5. It is noted that the applicant did not supply any arguments on newly added independent claim 21.

6. It is noted by the Examiner that the claim objections and 112 rejections made in the previous Office Action have been withdrawn due to amendment by the Applicant.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lee Fineman whose telephone number is (703) 305-5414. The examiner can normally be reached on Monday - Friday 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (703) 305-0024. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.

LAF

August 4, 2003


MARK A. ROBINSON
PRIMARY EXAMINER